

City of Las Vegas Code and Interpretation

AMEND: 24

DATE: December 19, 2008

CODE: 2006 IBC ☐ 2005 NEC ☐ Local Amendments ☐
 2006 IRC ☐ 2006 UMC ☐ POOL CODE ☐
 2006 IECC ☐ 2006 UPC ☐ MISC. ☒ Admin Code

CODE SECTION: Admin policy and procedure

TOPIC: Provide service size, total load and number of meters on approved plans.

PURPOSE/REASON: Single line diagram for commercial buildings and strip malls with multi meter switch gear need to indicate the size of the service, over current protection and all meters with the total connected loads. The service disconnecting means is required to be rated no less than the rating required for the conductors and over current protection which includes adjustments for continuous loads. During single line inspections in a multi occupancy commercial building, electrical inspectors frequency find that the size of the exiting service is smaller than what is shown on the approved plans and the total number of meters installed exceeds what is indicated by the contractor on the plans. In some situations this has resulted in a service upgrade causing delays and added expense to the customer. Requiring contractors to provide this information at the plan review stage would benefit the contractors, plans examiners, and electrical inspectors, resulting in more efficient and better customer service. The service size and the total connected load for multi meter switch gear must be indicated on all approved plans. This includes the actual number of meters that are installed with the connected loads for each meter.

INTERPRETATION:

December 5, 2008

Re: Load Summary vs. actual Load Calculations

Recently, it has been brought to my attention that our department has adopted the policy of accepting a "Load Summary" as a means of ascertaining the proper size of the electrical service and service feeders for various projects. This includes both existing and new projects.

In reviewing the National Electrical Code, I can find no code reference to a "load summary". However, the code is very clear on how to perform actual load calculations on both new and existing installations. The proper way to meet the National Electrical Code in regards to this matter is explained in the following paragraphs.

First, Article 230 of the NEC states that the sizing of either the underground or overhead service conductors shall not be less than the calculated loads according to Article 220. If we don't follow these guidelines, we end up with service conductors that may be undersized for the connected loads, and they would simply overheat and eventually burn up. Service conductors are not protected against overload like feeder or branch circuit conductors within a building. Utilities usually provide overcurrent protect at a much higher level than that required in the NEC. This is because the utility transformers feed more than a single service, so the protection level is based on the entire load of the transformer and does not protect the individual service conductors.

NEC Article 220 contains requirements on how to properly size branch circuits, feeders and services based on the loads served by those conductors. Article 220 also breaks down the calculation methods for each type of occupancy. For example, it gives us basic figures for office buildings, banks, hospitals, etc. Keep in mind that the code deals with the bare minimum requirements, and anything below that minimum is basically illegal since the code is adopted by our jurisdiction.

When a building is in any design stage, there will be a stated intended use, such as business offices, mercantile, medical or manufacturing. Based on this scope of design, we can assess a basic value for load calculation and then add in the mechanical loads as designed. We can then make a demand figure for this building based on their intended use of the facility.

If the use of any portion of the building (or the whole building) changes from its original designed use, then we would simply recalculate it according to the new use. If the facility has any specialized equipment that is above the general amount of utilization equipment normally found in that type of occupancy, then we would ask for a detail listing of that equipment and assess the added loads to the base number established by the code minimums.

For existing locations, there is a separate section of Article 220 that provides us with a code compliant method of establishing a starting figure when we are modifying or adding new loads to an existing service. Article 220.97 Exception gives us the method to use. This allows more than one acceptable method, without having the design professional redo a calculation on the entire building starting from scratch. The methods described give a value that will be based on actual recorded loads, and then add 25% to that amount. We are then able to add the new loads and compare the new total to the size of the existing service and service entrance conductors to ensure no overload conditions will be created.

With the current policy of accepting a "Load Summary", which cannot be backed up by any factual method, we have the possibility of creating overloads to both the service equipment and conductors. When these conditions are created, the result will be equipment failure and possibly other damage that may cascade to loss of property and life. We have in the past accepted "Load Summaries" which showed only "X" number of units connected to a main service. When we appear onsite, the actual conditions have not only "X" connected, but up to twice "X". The field staff notices this, and we ask to have the construction documentation corrected to show what is really connected to the service so we can verify it is code compliant. When the contractor or the design professional attempts to correct the documentation, the plans check staff are instructed to accept just the "Load Summary" document, even though we have verified it is unrealistic. This seems to be irresponsible when we have an established methodology in the code for dealing with this very situation.

In summary, when we have a new construction project, we should require a calculated load based on the design perimeters laid out in the NEC. On existing construction, where any loads are being added to an existing service, we should also have actual calculated loads based on the conditions described in the NEC. We adopt the code and should use it as our framework. I recognize the practice of accepting a convenient and quick way out for the designers may in some cases give the appearance of good customer service. But we must keep in mind who our actual customers are: they are not the designers, they are the building and property owners who depend on us to verify we have a safe and code compliant installation, not something that is inaccurate and, at best, just a guess.

One additional thought would be to create a form to use, similar to the residential loads calculation form we use presently. This form would outline a recognized way to establish a baseline load figure for existing buildings. This would aid those less than proficient designers and help them give us something we can actually relate to the code.

Approved: Chris Knight, CBO